

## **Proposed Item for Biobased Designation**

The following biobased product information has been collected to support item designation by USDA for the BioPreferred Program. This summary reflects data available as of December 3, 2007.

**Title:** Slide Way Lubricants

**Description:** Products used to provide lubrication and eliminate stick-slip and table chatter by reducing friction between mating surfaces, or slides, found in machine tools.

**Companies Supplying Item:** 3 companies supplying Slide Way Lubricants have been identified through internet searches, manufacturer's directories, trade associations, and company submissions.

**Industry Associations Investigated:** The following industry associations have been investigated for member companies supplying Slide Way Lubricants:

- United Soybean Board
- Iowa Soybean Association
- Organic Trade Association
- Independent Lubricant Manufacturers Association
- National Lubricating Grease Institute
- Society of Tribologists and Lubrication Engineers

**Commercially Available Products Identified:** Of the companies identified, 4 Slide Way Lubricants are commercially available on the market.

**Product Information Collected:** Specific product information including company contact, intended use, biobased content, and performance characteristics have been collected on 4 Slide Way Lubricants.

**Industry Performance Standards:** Product information submitted by biobased manufacturers and suppliers indicate that have typically been tested to the following industry standards:

- ASTM International D2161 Standard Practice for Conversion of Kinematic Viscosity to Saybolt Universal Viscosity or to Saybolt Furol Viscosity
- ASTM International D2270 Standard Practice for Calculating Viscosity Index From Kinematic Viscosity at 40 and 100°C
- ASTM International D2782 Standard Test Method for Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)
- ASTM International D2783 Standard Test Method for Measurement of Extreme-Pressure Properties of Lubricating Fluids (Four-Ball Method)
- ASTM International D287 Standard Test Method for API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)
- ASTM International D445 Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and Calculation of Dynamic Viscosity)
- ASTM International D5864 Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components

- ASTM International D665 Standard Test Method for Rust-Preventing Characteristics of Inhibited Mineral Oil in the Presence of Water
- ASTM International D92 Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
- ASTM International D97 Standard Test Method for Pour Point of Petroleum Products

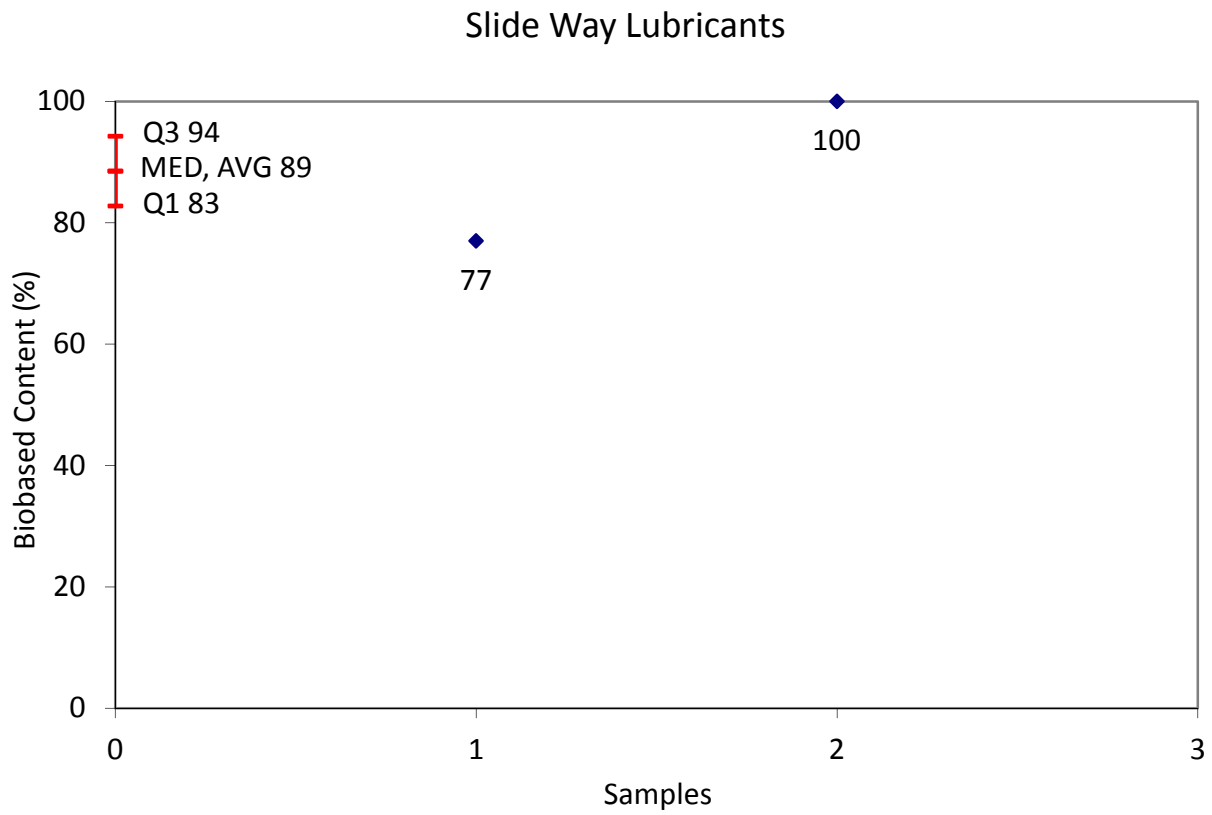
**Samples Tested for Biobased Content:** 2 samples of Slide Way Lubricants have been submitted to independent laboratories for biobased content testing as specified by ASTM standard D6866-04.

**Biobased Content Data:** Results from biobased content testing of Slide Way Lubricants indicate a range of content percentages from 77% minimum to 100% maximum biobased content as defined by ASTM D 6866-04. A detailed distribution of biobased content levels is included as Appendix A.

**Products Submitted for BEES Analysis:** Life-cycle cost and environmental effect data for 1 Slide Way Lubricant have been submitted to NIST for BEES analysis.

**BEES Analysis:** The life-cycle costs of the submitted Slide Way Lubricants range from 14.28 minimum to 14.28 maximum per usage unit. The environmental scores range from 0.0600 minimum to 0.0600 maximum. A detailed summary of the BEES results is included as Appendix B.

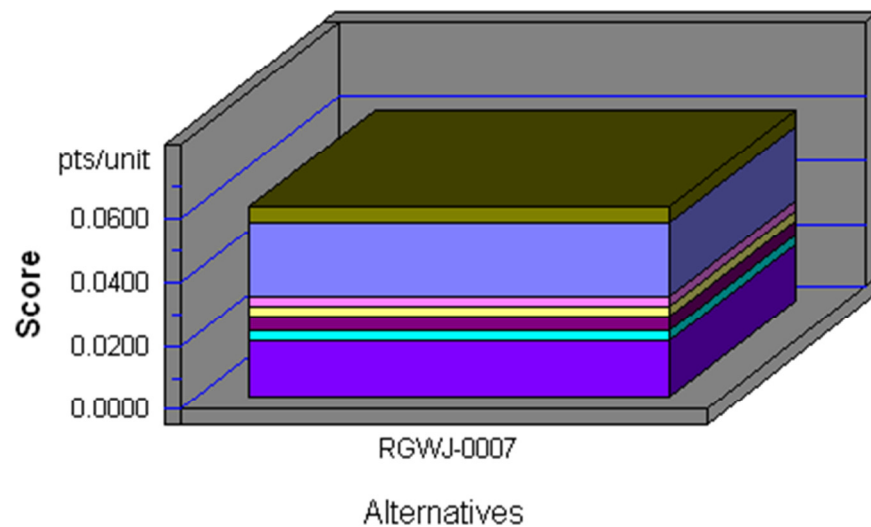
## Appendix A - Biobased Content Data



	Company	Product	C14	BEES
1	RGWJ	RGWJ-0007	77	Yes
2	HAKV	HAKV-0031	100	

## Environmental Performance

Acidification
Crit. Air Pollutants
Ecological Toxicity
Eutrophication
Fossil Fuel Depletion
Global Warming
Habitat Alteration
Human Health
Indoor Air
Ozone Depletion
Smog
Water Intake



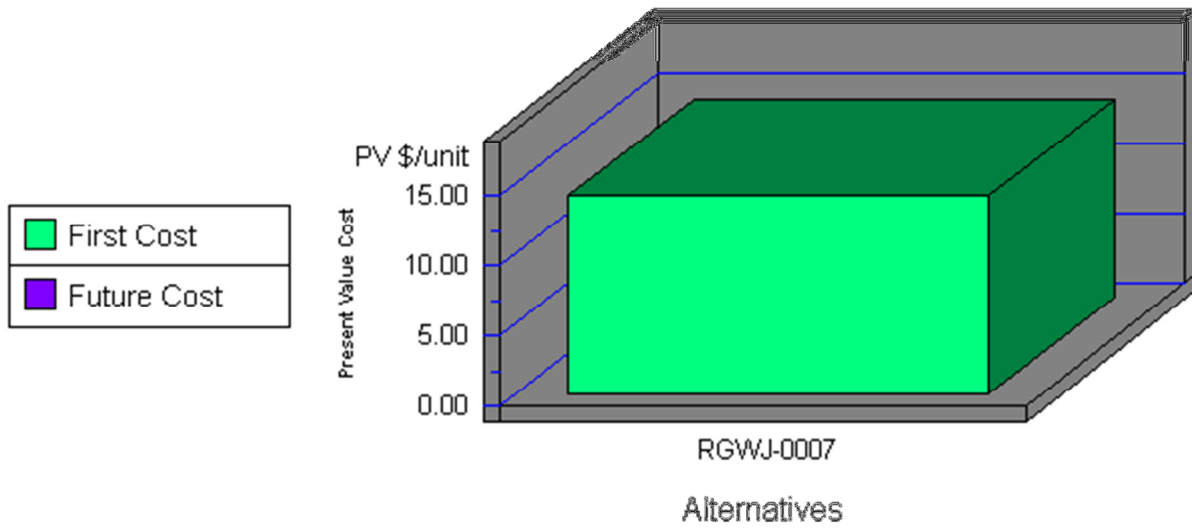
**Note: Lower values are better**

Category	RGWJ-0007
Acidification-3%	0.0000
Crit. Air Pollutants-9%	0.0002
Ecolog. Toxicity-7%	0.0049
Eutrophication-6%	0.0234
Fossil Fuel Depl.-10%	0.0029
Global Warming-29%	0.0030
Habitat Alteration-6%	0.0000
Human Health-13%	0.0049
Indoor Air-3%	0.0000
Ozone Depletion-2%	0.0000
Smog-4%	0.0026
Water Intake-8%	0.0181
<b>Sum</b>	<b>0.0600</b>

Slide Way Lubricants		
Impacts	Units	RGWJ-0007
Acidification	millimoles H <sup>+</sup> equivalents	5.46E+03
Criteria Air Pollutants	microDALYs	4.44E-01
Ecotoxicity	g 2,4-D equivalents	5.75E+01
Eutrophication	g N equivalents	7.48E+01
Fossil Fuel Depletion	MJ surplus energy	1.02E+01
Global Warming	g CO <sub>2</sub> equivalents	2.65E+03
Habitat Alteration	T&E count	0.00E+00
Human Health--Cancer	g C <sub>6</sub> H <sub>6</sub> equivalents	3.14E+00
Human Health--NonCancer	g C <sub>7</sub> H <sub>8</sub> equivalents	2.09E+03
Indoor Air Quality	g TVOCs	0.00E+00
Ozone Depletion	g CFC-11 equivalents	7.46E-08
Smog	g NO <sub>x</sub> equivalents	9.70E+01
Water Intake	liters of water	1.20E+03
Functional Unit	-----	1 gallon of slide way lubricant

1 Following are more complete descriptions of units: Acidification: millimoles of hydrogen ion equivalents; Criteria Air Pollutants: micro Disability-Adjusted Life Years; Ecological Toxicity: grams of 2,4-dichlorophenoxy-acetic acid equivalents; Eutrophication: grams of nitrogen equivalents; Fossil Fuel Depletion: megajoules of surplus energy; Global Warming: grams of carbon dioxide equivalents; Habitat Alteration: threatened and endangered species count; Human Health-Cancer: grams of benzene equivalents; Human Health-NonCancer: grams of toluene equivalents; Indoor Air Quality: grams of Total Volatile Organic Compounds; Ozone Depletion: grams of chloroflourocarbon-11 equivalents; Smog: grams of nitrogen oxide equivalents; and Water Intake: liters of water.

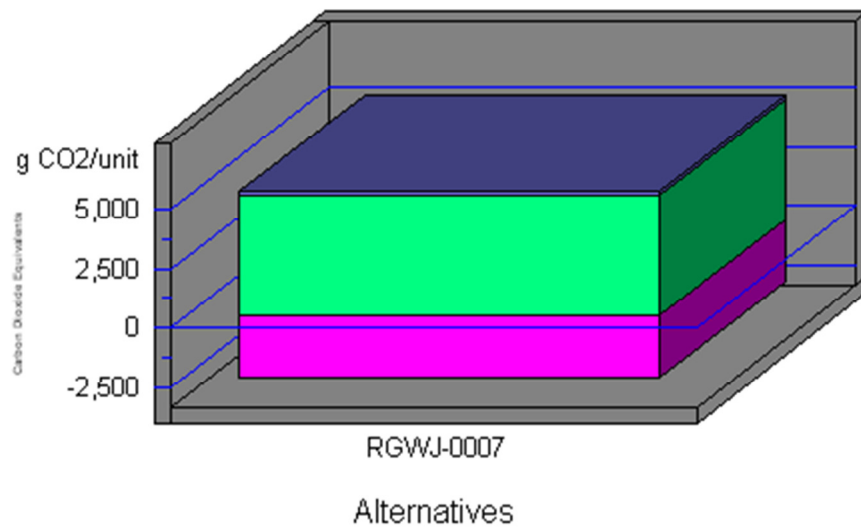
# Economic Performance



\*No significant/quantifiable performance differences were identified among competing alternatives. Therefore, future costs were not calculated.

# Global Warming by Flow

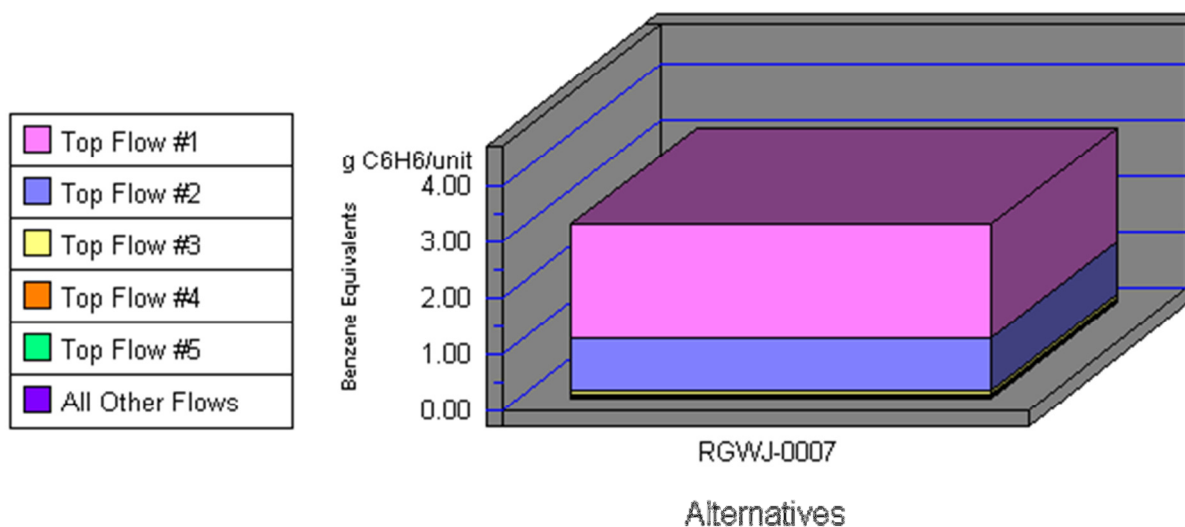
Carbon Dioxide
Carbon Tetrachloride
Carbon Tetrafluoride
CFC 12
Chloroform
Halon 1301
HCFC 22
Methane
Methyl Bromide
Methyl Chloride
Methylene Chloride
Nitrous Oxide
Trichloroethane



**Note: Lower values are better**

Category	RGWJ-0007
(a) Carbon Dioxide (CO <sub>2</sub> , net)	-2634
(a) Carbon Tetrachloride (CCl <sub>4</sub> )	0
(a) Carbon Tetrafluoride (CF <sub>4</sub> )	0
(a) CFC 12 (CCl <sub>2</sub> F <sub>2</sub> )	0
(a) Chloroform (CHCl <sub>3</sub> , HC-20)	0
(a) Halon 1301 (CF <sub>3</sub> Br)	0
(a) HCFC 22 (CHF <sub>2</sub> Cl)	0
(a) Methane (CH <sub>4</sub> )	226
(a) Methyl Bromide (CH <sub>3</sub> Br)	0
(a) Methyl Chloride (CH <sub>3</sub> Cl)	0
(a) Methylene Chloride (CH <sub>2</sub> Cl <sub>2</sub> )	0
(a) Nitrous Oxide (N <sub>2</sub> O)	5057
(a) Trichloroethane (1,1,1-CH <sub>3</sub> Cl)	0
<b>Sum</b>	<b>2648</b>

## Human Health Cancer by Sorted Flows\*



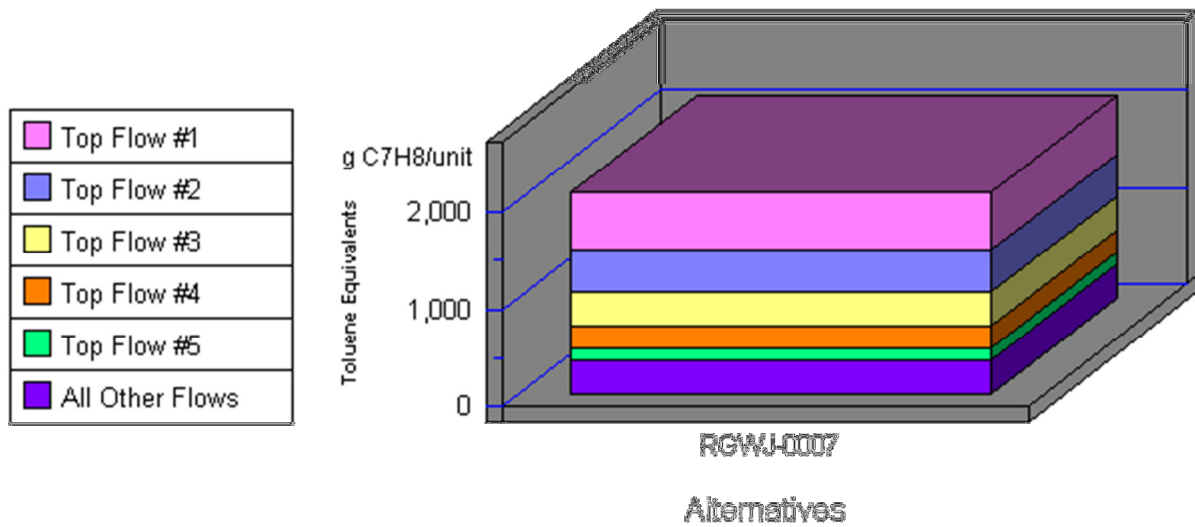
**Note: Lower values are better**

Category	RGWJ-0007
Cancer--(w) Arsenic (As3+, As5+)	2.05
Cancer--(w) Phenol (C6H5OH)	0.92
Cancer--(a) Dioxins (unspecific)	0.08
Cancer--(a) Arsenic (As)	0.04
Cancer--(a) Benzene (C6H6)	0.03
All Others	0.02
<b>Sum</b>	<b>3.14</b>

\*Sorted by five topmost flows for worst-scoring product



## Human Health Noncancer by Sorted Flows\*



Note: Lower values are better

Category	RGWJ-0007
Noncancer--(w) Barium (Ba++)	611.28
Noncancer--(w) Mercury (Hg+, Hg	427.75
Noncancer--(w) Lead (Pb++, Pb4+	342.58
Noncancer--(w) Cadmium (Cd++)	216.94
Noncancer--(w) Arsenic (As3+, A	129.68
All Others	362.66
<b>Sum</b>	<b>2,091.08</b>

\*Sorted by five topmost flows for worst-scoring product